

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 1 023 866 A1**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
02.08.2000 Bulletin 2000/31

(51) Int Cl.7: **A47L 11/34, A47L 11/40,**  
**F22B 1/28**

(21) Application number: **99101439.0**

(22) Date of filing: **27.01.1999**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU**  
**MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(72) Inventor: **Milanese, Andrea**  
**31058 Susegana (TV) (IT)**

(74) Representative: **Gustorf, Gerhard, Dipl.-Ing.**  
**Patentanwalt,**  
**Bachstrasse 6 A**  
**84036 Landshut (DE)**

(71) Applicant: **Euroflex S.r.l.**  
**31010 Marenco di Piave (TV) (IT)**

### (54) Easily portable linear-shaped steam generating unit

(57) The invention relates to a novel, light-weight and manageable compact unit for the generating and releasing of steam (A), being of linear shape, that is generically tube-shaped, whose upper end is shaped as a handle. It comprises a relatively narrow and high cylindrical boiler with the pertinent accessories, in particular a quick-action coupling for the generating and releasing of steam. To this quick-action coupling can be attached a brush (14) either with or without bristles, a rag-holder, a steam discharge nozzle, or an additional tube ending in a nozzle or a brush. The novel unit is much more manageable and handier than the regular steam cleaners, and it can be easily stored in limited spaces. By removing the handle and attaching a strap, the unit can be used by carrying it on the back to work on vertical surfaces or objects, no matter how high they are.

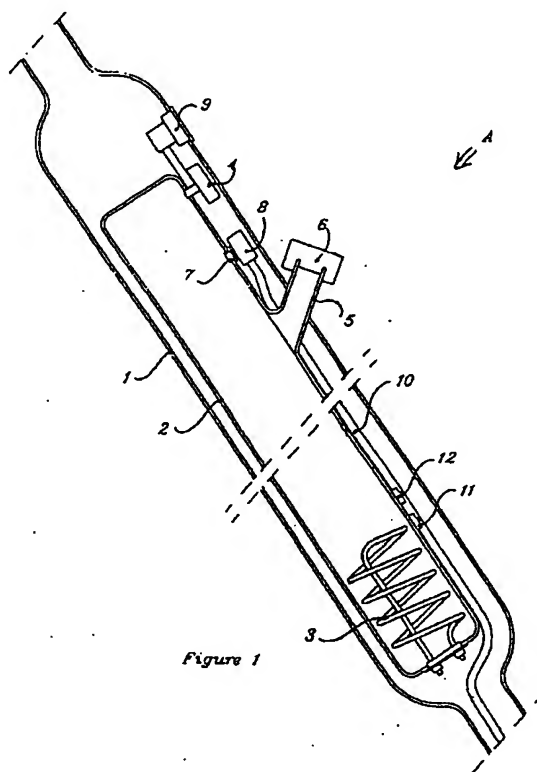


Figure 1

EP 1 023 866 A1

## Description

[0001] This patent relates to the field of steam cleaning and washing machines. Known are steam cleaning machines, constituted by a boiler with an electric heater provided with a flexible hose and a rigid tube at the end of which is attached a multifunctional brush (with bristles, without bristles, rag-holder) The boiler is mounted on wheels so that it can trail the cleaning brush.

[0002] Such cleaning machines are very cumbersome because the rigid tube, the flexible hose and the wheel-mounted boiler frequently create hindrances to the user, entailing many encumbrances and rigidity of movement of the brush.

[0003] Furthermore, given the configuration and the capacity of the boiler, some time elapses before the water vaporizes and reaches the operational pressure.

[0004] There are steam cleaners specifically for floors, in which the boiler and the brush or the nozzle are enclosed in one only housing which is provided with wheels and a handle. These cleaners must be rolled on the floor to be cleaned. Such type of cleaners are very heavy and inconvenient to drag along on different floors, especially on steps.

[0005] The main object of the present invention is a novel, light-weight and manageable, compact unit for the generating and releasing of steam.

[0006] The novel steam-generating unit has a linear shape, is generically tube-shaped, and its upper end is shaped as a handle. Such a unit, provided with a housing, comprises a boiler, a thermoelectric resistance, a steam tube, a quick-action coupling, an electrovalve for the release of the steam, two thermostats, a water level sensor, and a manometer.

[0007] The boiler is constituted by a relatively narrow and high cylindrical tank, preferably made out of steel or a metal alloy. On the bottom portion of the tank is provided the thermoelectric resistance for the heating of the water.

[0008] On the upper portion of the boiler is attached the steam-outlet tube from the boiler. This tube runs along the side of the boiler and connects to the quick-action coupling at the bottom of the housing. On the upper portion of the boiler is provided a plug for the filling of water.

[0009] The electrovalve for the steam flow is inserted into the steam-outlet tube.

[0010] The electrovalve is generally closed and opens electrically by means of a pulsating control that is preferably provided on the handle so that, at the desired moment, it releases the pressurized steam, already generated and contained in the boiler. The manometer and the pressurestat are also provided on the upper portion of the boiler tank, the manometer indicates the internal pressure of the boiler tank while the pressurestat indicates the depletion of water.

[0011] The two thermostats, one for the operation and the other for safety, are installed on the tank at an ap-

propriate position. One of these thermostats, fixed or adjustable, controls the operation of the thermoelectric resistance for the constant steam generation.

[0012] The other thermostat controls the entire electric circuit and is actuated in the case of an overheating of the boiler. This second thermostat can also be substituted with a thermal fuse.

[0013] The water pressure, and consequently its generating, is also controlled by the pressurestat having a predetermined setting. The pressurestat actuates the pertinent warning light when the water is exhausted.

[0014] On the handle is provided a safety device that opens the electric power circuit of the resistance in the boiler when the unit is lowered beyond a determinate level.

[0015] As a matter of fact, it is necessary that the electric resistance be always surrounded by water. If the unit is inadvertently placed horizontally or if the water, contained inside the boiler tank, is spilled, an ensuing overheating may result by leaving the resistance uncovered.

[0016] The unit also comprises a safety device consisting of a ball inserted in a guide cylinder that, in its regular position, actuates either directly or through a lever upon a microswitch for the power supply to the resistance in the boiler while, if the unit is lowered, this ball moves inside the cylinder releasing the lever and opening the microswitch.

[0017] On the handle is also provided a trigger lever with a pull-back spring that actuates on the microswitch in order to open the electrovalve for the release of steam.

[0018] Also provided is a main switch and a warning light signal connected to the safety circuit system.

[0019] The unit can also be provided with a non-pressurized auxiliary tank and a pump which draws the water out of said tank and causes it to flow into the boiler. With such an auxiliary tank it is possible to refill the water in the unit even while it is being used. It is possible to attach different devices to the quick-action coupling at the bottom of the housing, such as, for example, a brush either with or without bristles, a rag-holding accessory, a steam discharge nozzle, an additional tube ending in a nozzle or a brush.

[0020] The novel steam-generating unit, as described above, is much more manageable and handier than the regular steam cleaners. As a matter of fact, this novel steam-generating unit can be easily stored in limited spaces such as, for example, behind a door, while its weight is distributed along its length which renders it much handier and coupled to a brush, even without using steam, constitutes a large brush.

[0021] Removing the end of the handle and attaching one or more straps to the steam-generating unit, together with a flexible hose and a nozzle, the unit can be used by carrying it on one's back to work on vertical surfaces or objects, no matter how high they are. The accompanying illustrations show by way of example, but not limitative, an embodiment of the invention.

[0022] Figure 1 shows a vertical section of the novel steam-generating unit (A). In this illustration can be easily seen the housing (1) inside of which is the boiler-tank (2) in whose bottom portion is installed a thermoelectric resistance (3). On the upper portion of the tank-boiler (2), in addition to the filling tube (5) with a plug (6), is provided the manometer (9) and the pressurestat (4), the opening (7) with the electrovalve (8) for the controlled release of the steam through a tube (10), provided at the bottom part of the housing (1).

[0023] In the bottom portion of the tank-boiler (2) are provided two thermostats, of operation (11) and of safety (12).

[0024] Figure 2 shows a type of embodiment of the novel steam-generating unit (A) in conjunction with a brush (14).

[0025] Figure 3a shows a vertical section and Figure 3b a horizontal section of the handle with the safety device, which is constituted by a ball (16) inserted in a guide cylinder (17) that actuates upon a lever (18) and on a microswitch (19) for the power supply to the resistance in the boiler. Also shown is the trigger lever (20) provided with a pull-back spring (21) that actuates upon the microswitch (22) for the opening of the steam electrovalve, the main switch (23) and the safety warning light (24).

[0026] Figure 4 shows the unit provided with a non-pressurized auxiliary tank (25) with a simple plug (26) and a pump (27) that draws the water out of the tank (25) and causes it to flow into the boiler (2) provided with an outlet opening (28).

[0027] These diagrammatic representations are sufficient for the experts to carry out the invention; accordingly, in a concrete application they may contain variants without prejudice regarding the substance of the innovative concept.

[0028] Therefore, making reference to the above description and the accompanying illustrations, the following claims are put forth.

## Claims

1. A steam-generating unit comprising a boiler, a thermoelectric resistance, a steam tube, quick action coupling, an electrovalve for the release of the steam, two thermostats, one pressurestat indicating the depletion of water, and a manometer, characterized by the fact that it has a linear shape, that it is generically tube-shaped and that its upper end is shaped as a handle.
2. A steam-generating unit in accordance with claim 1, characterized by the fact that it comprises a quick-action coupling for the attaching of accessories, such as, for example, brushes, nozzles and a rag-holder.
3. A steam-generating unit in accordance with claim 1, characterized by the fact that its handle can be removed and that one or more straps can be attached in order to be able to operate, in conjunction with a flexible hose and a nozzle, on high and/or slanted surfaces.
4. A steam-generating unit in accordance with claim 1, characterized by the fact that at its upper portion it is provided with a safety device consisting of a ball inserted in a guide cylinder, which in its regular position actuates either directly or by means of a lever on a microswitch for the power supply to the resistance in the boiler, in which, when the unit is lowered, said ball moves inside said cylinder releasing the lever and opening the microswitch.
5. A steam-generating unit in accordance with claim 1, characterized by the fact that on the handle is provided a trigger lever with a pull-back spring that actuates upon the microswitch for the opening of the steam electrovalve.
6. A steam-generating unit in accordance with claim 1, characterized by the fact that it comprises an auxiliary, non-pressurized tank as well as a pump that draws the water from said tank and carried it to the boiler.

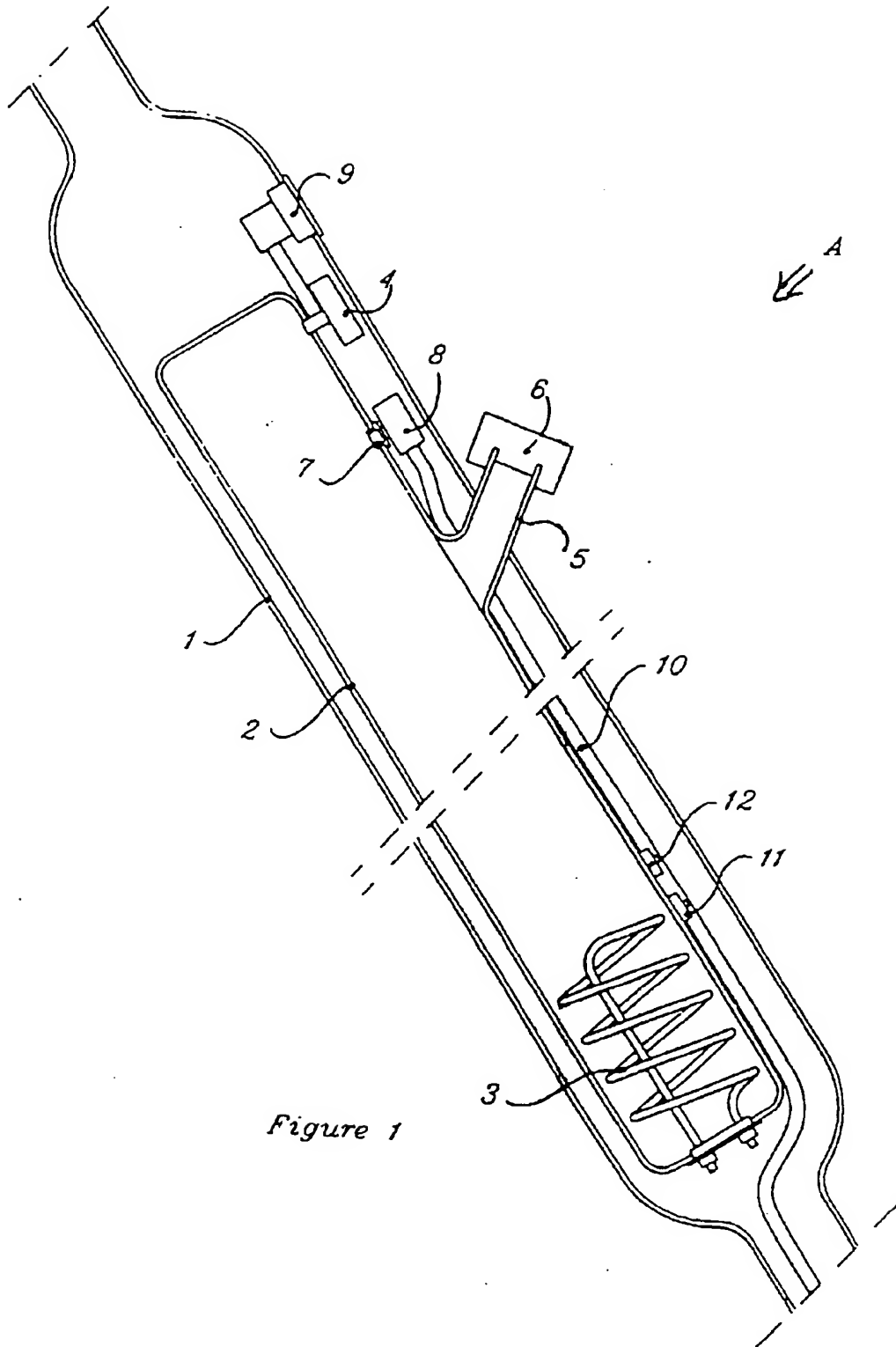
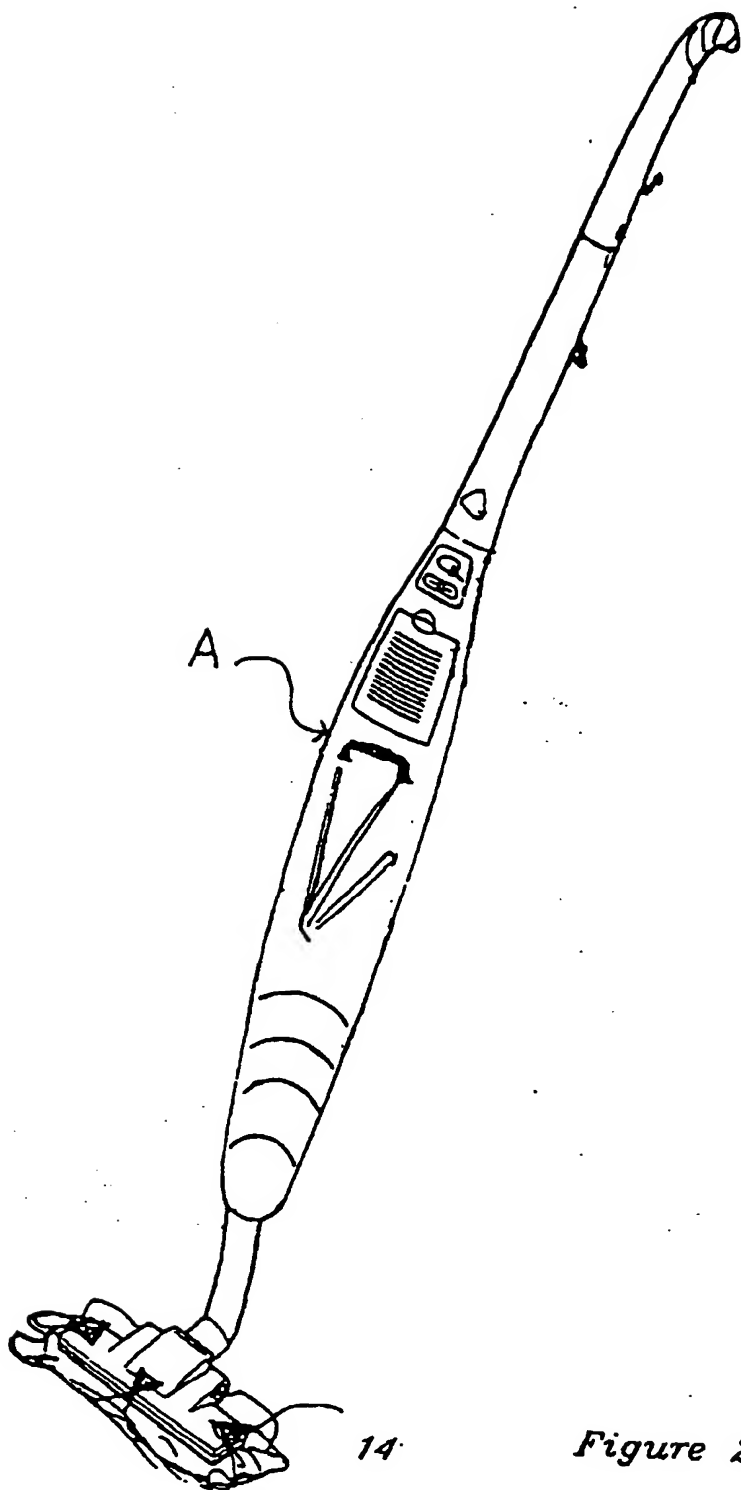


Figure 1



*Figure 2*

Figure 3b

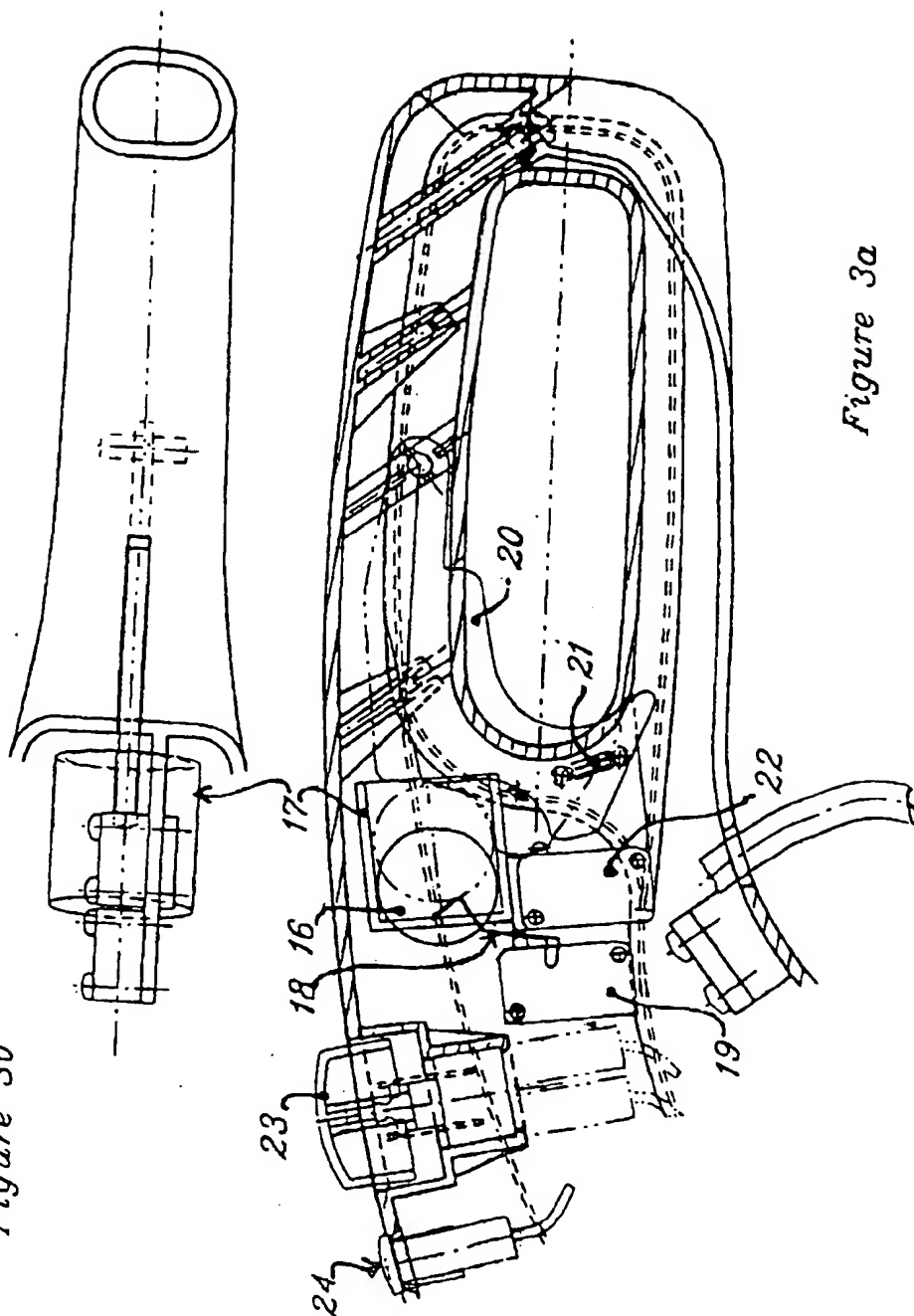


Figure 3a

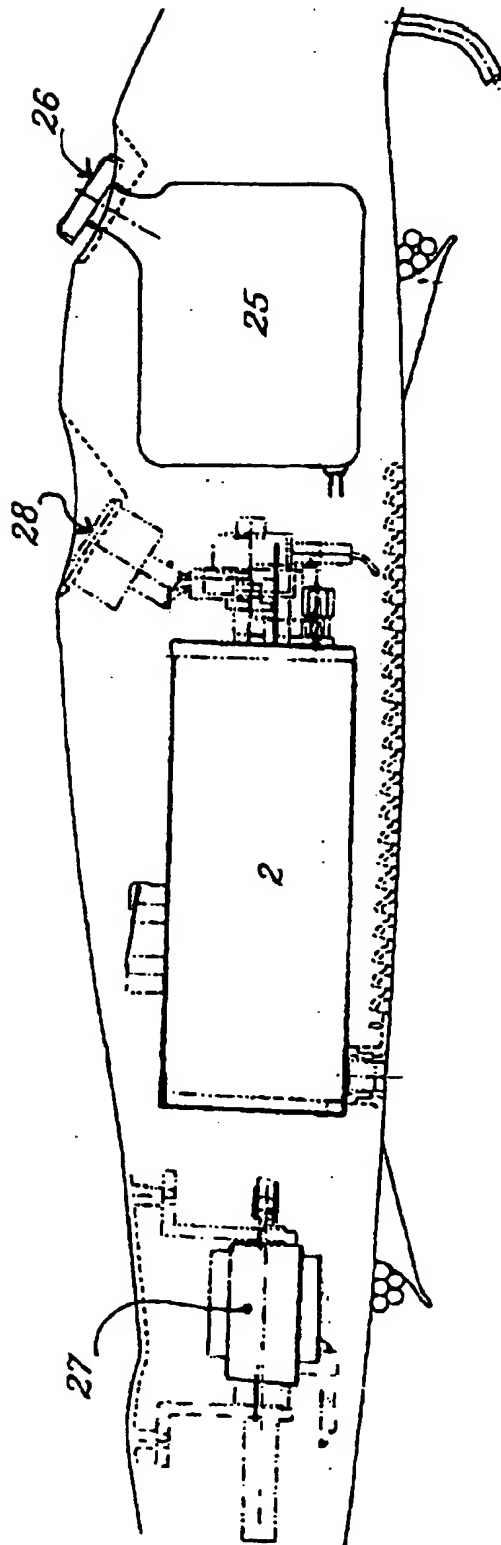


Figure 4



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 99 10 1439

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	DE 91 10 171 U (VORWERK & CO INTERHOLDING GMBH) 25 March 1993 * page 3, line 8 - line 19 * * page 8, line 18 - line 33 * * page 11, line 11 - page 12, line 21 * * page 14, line 9 - page 16, line 31 * * page 22, line 28 - page 23, line 9 * * figures 1,2,5,6,13 * ---	1,2,5,6	A47L11/34 A47L11/40 F22B1/28
Y	EP 0 703 407 A (ETAIROI HOLDING S A) 27 March 1996 * abstract * * column 2, line 9 - column 4, line 5 * * figures * ---	1,2,5,6	
A	EP 0 253 910 A (ELWATT SRL) 27 January 1988 * abstract * * page 1, line 3 - page 2, line 13 * * page 4, line 2 - page 5, line 21 * * page 6, line 3 - page 7, line 1 * * figures * ---	1,2,5,6	
A	PATENT ABSTRACTS OF JAPAN vol. 098, no. 001, 30 January 1998 -& JP 09 253016 A (TEC CORP), 30 September 1997 * abstract * ---	1,6	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A47L F22B
A	PATENT ABSTRACTS OF JAPAN vol. 098, no. 001, 30 January 1998 -& JP 09 224891 A (TEC CORP), 2 September 1997 * abstract * ---	1,6	
A	EP 0 625 331 A (SAMSUNG ELECTRONICS CO LTD) 23 November 1994 * abstract; figure 2 * ---	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search: 1 July 1999	Examiner Cabral Matos, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (Pct/C11)





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 99 10 1439

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (InLCI.6)
A	US 5 836 046 A (COON R C ET AL) 17 November 1998 * abstract; figure 8 * ---	3	
A	US 5 588 177 A (ERIKSEN S M) 31 December 1996 * abstract; figures 1,2 * -----	3	
			TECHNICAL FIELDS SEARCHED (InLCI.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 July 1999	Examiner Cabral Matos, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.02) [P4/C01]

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 10 1439

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-07-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 9110171 U	25-03-1993	NONE	
EP 0703407 A	27-03-1996	IT PC940011 U	26-03-1996
		AT 166445 T	15-06-1998
		DE 69502562 D	25-06-1998
		DE 69502562 T	26-11-1998
		ES 2118465 T	16-09-1998
EP 0253910 A	27-01-1988	NONE	
EP 0625331 A	23-11-1994	KR 9614569 B	16-10-1996
		KR 9700330 Y	16-01-1997
		CA 2123740 A	20-11-1994
		CN 1103281 A	07-06-1995
		DE 69404746 D	11-09-1997
		DE 69404746 T	08-01-1998
		JP 2650851 B	10-09-1997
		JP 7000317 A	06-01-1995
		US 5502872 A	02-04-1996
US 5836046 A	17-11-1998	NONE	
US 5588177 A	31-12-1996	DK 61993 A	29-11-1994
		AU 6924494 A	20-12-1994
		DE 69404842 D	11-09-1997
		DE 69404842 T	12-03-1998
		WO 9427485 A	08-12-1994
		DK 703745 T	23-03-1998
		EP 0703745 A	03-04-1996
		ES 2107226 T	16-11-1997

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office No. 12/82